Literacy in the new norm: stay-home game plan for parents

Zamzami Zainuddin

Faculty of Education, University of Hong Kong, Hong Kong, Hong Kong and Department of Public Administration, Sekolah Tinggi Ilmu Administrasi Nasional, Lhokseumawe, Indonesia

Corinne Jacqueline Perera

Faculty of Education and Science, Shangrao Normal University, Shangrao, Jiangxi, China

Hussein Haruna

Writing Lab, Tecnológico de Monterrey, Mexico City, Mexico, and

Habiburrahim Habiburrahim

Faculty of Education, Universitas Islam Negeri Ar-Raniry, Banda Aceh, Indonesia

Abstract

Purpose – The purpose of this study is twofold. Firstly, this research aims at helping countries implement an equitable, innovative and context-appropriate stay-home game plan for the millions of disadvantaged and under-privileged students severely affected by the forfeiture of school closures; and secondly, this study proclaims that the burgeoning popularity of gamification has the potential to lay the bedrock foundation for 'Literacy in the New Norm'.

Design/methodology/approach – The temporal closure of schools around the world to limit the spread of the COVID-19 has resulted in massive educational disruptions triggering adverse effects and bringing much of education under grave threat. Through a review of the current empirical and conceptual literature, this study proposes a new gamification concept in a non-technology environment.

Findings – Well underway are global dialogues that hold conversations on implementing mitigation strategies to counter the looming global health crisis. This has generated the impetus for a more concerted effort by concerned governments and international organizations to identify appropriate solutions for the continuity of learning so that the learning never stops. While educators and learners plunge further into the core of reconstructing education, the authors recognize that the fundamentals of technology and virtual connectivity have all along contributed to the multi-faceted e-learning stage set. However, concerns regarding the paradigm shift to remote online learning would certainly exacerbate inequalities cardinally felt across disadvantaged communities around the globe.

Originality/value – As the world is currently bound by strict isolation measures, learners of all ages have been relegated to the confines of their homes. For the most part, the stark realities of technological mishaps that have befallen underprivileged school children, serve as a reminder to help target children all over the world who are in most peril of losing ground in terms of continued education. It is on these grounds that the criterion set out in this article elucidates the nature and scope of a supplementary stay-home game plan detailing the use of game affordances that bear intelligently in the creation of home-based activities for

parents to give it their best effort in fostering a collaborative and meaningful parent-child relationship that spawns the new language of literacy in the new norm.

Keywords COVID-19, Gamification elements, Literacy in the new norm, Non-tech gamification, Non-tech learning environment, Parent-led programme, Stay-home game plan

Paper type Conceptual paper

Introduction

COVID-19 barged into our lives without any warning, such as an uninvited guest rudely gatecrashing into our turf. This deadly pestilence has pulled the plug on all industries, and all economic activities all over the globe have come to a virtual standstill. Governments have taken stringent blockade isolation measures to enforce movement control orders, home quarantines, social and physical distancing and have declared curfews in some countries. Civil authorities and military personnel have been deployed to assist in the containment efforts to ensure that the general public adheres to the "stay-at-home" order. As the world remains hopeful that this deadly outbreak is temporal and will eventually be history, the magnitude of this pandemic has unleashed a revolution in the education realm, setting off the novel COVID-19 as the trend-setter that has ironically laid the bedrock foundation for "literacy in the new normal". This concept is best described as a paradoxical paradigm shift from the "previous normal" prescriptive curricula to the "new normal" parent-led home literacy programme. Taking into account the need for greater pragmatism, the *New Norm Literacy* proposed in this research may just be the answer in redefining the educational landscape in the bid to create new synergies of family learning partnerships and shared endeavours.

The crippling grip that COVID-19 has on the world has put a quandary on schools and its stakeholders. *Plan International* and UNESCO report on the statistics of this global lockdown citing COVID-19 schools and university closures in 191 countries, with over 1.54 billion children and youth currently out of school (Albrectsen and Giannini, 2020; UNESCO, 2020a). This is an unprecedented educational disruption that has adversely affected more than 89% of the world's student population. UNESCO (2020a) has further revealed that a staggering 826 million people across the globe do not have access to household computers or any form of internet-enabled devices in their homes; 706 million have reportedly no internet connectivity while 56 million students are deprived of mobile networking connectivity.

As a humanitarian organization, the UNESCO constitution rallied the support of concerned governments, human right advocates, grass-root action groups and international organizations at large, around a common hope that incites literacy for the world's children. On account of ensuring that the learning never stops, a global education coalition was launched by UNESCO through a [1] multi-lateral partnership with government agencies, multinational corporations, banking institutions, philanthropic and non-profit organizations and media outlets (UNESCO, 2020c). The impetus for consolidating this coalition was in response to meeting country-specific educational needs, aimed at helping countries implement equitable, innovative and context-appropriate solutions for teaching and learning.

On the home-front, state-mandated "stay-at-home" orders have got families confined to their homes (Gostin and Wiley, 2020; Wang *et al.*, 2020). In compliance to these home confinement regulations, close to 1.3 billion students worldwide are currently homebound owing to country-wide closures of schools and universities mandated by governments under the lockdown (UIS, 2019, 2020). However, during these incorrigible times, parents have become the primary contact point for their children at home. Bowing to fate, many parents have been weighed down daily with insurmountable demands as they grapple with trying to run a household while also having to juggle with home-based teaching activities that

would see their kids through the day. This can be a daunting experience especially for working parents who have minimal parenting skills or may have barely encountered a situation of having to child-mind a kid or supervise their school homework (Cluver *et al.*, 2020; Owusu-Fordjour *et al.*, 2020). In cities and semi-urban areas where students have seamless access to internet connectivity, schools have transitioned to supplemental learning online, so the learning never really stopped. However, communities from rural and underdeveloped regions of the world who lack internet connectivity are not able to transition to an online learning platform amid this pandemic. COVID-19 has certainly changed the landscape of education and new solutions have emerged for the population of school children impacted by this digital divide. On a positive note, what better place is there to be during a lockdown, for children to continue learning and developing, other than their very own homes? Under the best of these circumstances, home quarantines can offer families the safety net of knowing that their children may be schooled within the comforts of their homes, taught and monitored under the watchful eyes of their parents and children who crave for their parents attention, would be therapeutically comforted to have the liberty of snuggling up close against their parents while engaging in some form of learning activity (Chopik *et al.*, 2014).

As the primary caregiver, parents have the potential to help their children learn and grow through natural daily interactions and activities. Studies reveal that children's early learning experiences deeply affect their physical, intellectual, emotional and social development (Ding *et al.*, 2018; Groening and Binnewies, 2019; Wainwright *et al.*, 2020). Along these lines, Hajal and Paley (2020) assert that the degree of parental involvement is of utmost importance because of the emotionally evocative nature of parenting that can actually drive children's emotion socialization behaviours. Parents should, therefore, leverage on this lockdown to take on teaching roles and invest their time and energy into helping their children become more self-reliant and confident. It is a privileged time and season for families to stay connected, to reinforce their family bonds and learn to sharpen their parenting and teaching skills.

Nurturing a child through play-based learning actually lays the foundation for a positive and healthy behaviour. Contemporary works have highlighted the potential of games inducing the development of children's learning engagement, cognitive abilities and sensory motor skills while helping animate their imagination and self-expression (Buckley *et al.*, 2017; Ding *et al.*, 2018; Greco, 2020; Huang *et al.*, 2018; Kuo and Chuang, 2016; Lopez and Tucker, 2019; Lo and Hew, 2018; Zaki, 2020). This is the background upon which the present study has arrived with a stay-home game plan that proposes to gamify learning activities through a parent-led offline programme.

Stay-home game plan

Responding to the pandemic that brought about the suspension of schools, a team of international organizations [2] have devised a support platform to enable open access to parenting resources during COVID-19. This global initiative has authored a parenting resource charter in 55 languages, in response to countering the increased complexities and uncertainties that parents are being challenged with (Appendix A). Just the same, UNESCO Beirut introduced a stop-gap solution by devising flyers intended as a guide to help parents manage their home-based coaching. It may be a short-term fix but this schedule is a useful set of guidelines highly beneficial for caregivers. Through this frame of reference, parents are in turn persuaded to reciprocate accordingly, amidst mitigating the impact of their children being physically displaced from school. Refer to Appendices B and C as the actionable guides that take into consideration the literacy needs and educational attainment of children and the inner mechanics of children's brain development shaped by responsive caregiving (Cluver *et al.*, 2020; Montoya, 2020).

Gamification in a non-tech environment

The researchers have pulled together ideas in offering a "no frills", back-to-basics mode of learning using offline resources in a home setting. This is an offline solution for those without home online access or with low-bandwidth access. The idea of incorporating the concept of gamification in a non-tech environment signals the move away from the digital hype in favour of the conventional parent-child home study. Zainuddin *et al.* (2019) declares that gamification research in non-tech environments has been inadequately investigated. Then again Zainuddin *et al.* (2020) reiterates that the wide body of literature on gamified learning rarely reports on using gamification in non-technological environments. That being the case, the authors of this study are eager to offer some novel ideas as to the implementation of game dynamics into a non-tech environment. The researchers also echo the same concerns highlighted in Zainuddin *et al.* (2019) and anticipate that the present study will be an avenue for further research directed at the technological challenges faced by disadvantaged and vulnerable segments of society, associated with accessibility and connectivity issues. Future research efforts should establish priorities in identifying data gaps in the educational sector and investigate emergent concerns that may have surfaced in the aftermath of COVID-19.

Pedagogy in the unfolding pandemic: parents as change agents

As the pandemic unfolds and schools are not physically accessible, there is a pressing need for a multilateral stakeholder initiative to solve social inequities that have impacted the downslide of education as the outbreak of COVID-19 (Doucet *et al.*, 2020). Teachers, school authorities and parents are urged to engage in institutionalized dialogues to address the learning needs of each individual child. On the home front, parents are becoming increasingly engaged in their children's home study programmes, while getting involved in the challenges of changing systems. Home based learning allows parents the latitude to make decisions that impact home based instruction, such as homework and discipline. Given that teachers are also part of the learning institution, they emblematize the conduit through which parents' can be made aware about teachers recommended resources and coaching guidelines that identify with competency-based pedagogies. That said, teachers should use their professional judgement to rethink learning methodologies and contribute their expertise towards the best interest of their students (Doucet *et al.*, 2020). The authors have chronicled a well-curated pedagogical resource framework for home-based learning and coaching to take place in a safe and effective nurturing environment.

Tracing back to the edutainment movement pioneered by computer games in the early 1970s, it paved the way for the gamification movement in 2010, where game elements such as points, levels, rewards, leaderboards, quests and customizations guided the instructional design. In fact, there are a whole host of game element affordances cited in Zainuddin *et al.* (2020) that have the potential to forge pleasure-reward sensations as a gratifying stimulus that pander to learners' interest. Similarly, various studies confer with this reward system of assigning points for tasks accomplished (de Byl and Hooper, 2013; Zuckerman and Gal-Oz, 2014). Parents can get creative about any sort of reward they wish to incentivize their kids with, by leveraging on the extensive range of affordances available to tailor their home-based activities. However, it is important for parents to set clear rules in their households and explain the rationale behind them along with the consequences of imposing a punishment that is emotionally safe and not a form of abuse. This would help children differentiate between what is right and wrong, and ultimately build their moral compass over time. In the event that children do display desired behaviours and refrain from displaying bad behaviour, they should be rewarded or given praise as a form of acknowledgement.

Apart from that, Groening and Binnewies (2019) attests to the claim that the aesthetics of game design and mechanics are increasingly being recognized as the driving force that

evoke emotional responses. Likewise, other studies have shown that these external awards represent non-technology gamification elements that are capable of invigorating learning, injecting fun into the activities and fulfilling the holistic needs of children (Abramovich *et al.*, 2013; Alsawaier, 2018; Gibson *et al.*, 2015; Lopez and Tucker, 2019; Nah *et al.*, 2014). These affordances are amongst the gamut of appraisal incentives purported to psyche-up and excite children, as well as transform their learning experiences into an eagerness, which may be translated to "literacy of the new norm". Typical examples of game elements include experience points (XP), certificate of achievement, stamps of endorsement, children's rubric for performance appraisal and badges and stickers as symbolic awards of achievement.

With gamification-based learning, children earn their badges or points based on their effort which demonstrates their mastery of a particular concept. According to Alsawaier (2018) and Brewer *et al.* (2013), gamification is not about winning but about rewarding the effort. Notwithstanding, Jurgelaitis *et al.* (2018) proclaims that the burgeoning popularity of game-based learning has the potential to instill acceptance for a challenge, create healthy competitions, promote voluntary learning, inculcate tolerance threshold and convert failures and defeats into rich learnt experiences.

Figure 1 is an illustration of reward stamps that teachers use as a novel means of recognizing and credentialing the skills and competences of their students in school-based settings. In home settings, parents also have the option of rewarding children for their daily task-based accomplishments. By leveraging on whatever resources they have, parents have the option of purchasing reward stamps or sticker labels online or they may choose to adopt other forms of rewards tokens such as creating their own paper badges simply by drawing them out on paper. Other priceless and equally effective incentives that parents, in particular, should inculcate is the habit of motivating their children with spoken words of encouragement, prepping them up with cheerful morning greetings, pinning up congratulatory notes, sending them random uplifting text messages (if available) and enticing them with additional fun-time with mum and dad, as an added incentive to spur on their learning process. As an additional bonus, parents may also offer children the option of swapping their reward points in exchange for real gifts of their choice, such as books or food.

With the increasing awareness of gamification for children, parents are keenly interested in incorporating engaging game elements into learning activities, setting goals for children and rewarding them for having achieved those personalized goals. More importantly, the

Figure 1.
Reward stamps

right game elements will reframe the mindsets of children, and shift their focus from what they cannot do, to what they can do. By transforming a mundane or serious task into a fun and playful gaming experience, it is found to increase their attentiveness, enthusiasm, confidence and participation. Another engaging tip for parents is to manually create a leaderboard to be exhibited on a wall, as a way of proudly displaying their children's accumulated scores. The leaderboard bulletin is a social persuasive strategy that sets forth a challenging and competitive environment that actively engages all children in a family in wanting to accumulate more scores and compete for better ranking (Ding *et al.*, 2018; Lin *et al.*, 2020; Ortiz-Rojas *et al.*, 2019). Leaderboards displayed openly allows family members to keep track of the children's score. Buckley *et al.* (2017) further claims that leaderboard rankings have a motivating effect on participants for their efforts are publicly and instantly recognized (Figure 2).

Figure 2 is a manually drawn leaderboard that makes use of non-verbal visuals such as emoji's and memes to communicate impactful messages. Under cheerful circumstances, game mechanics such as emoji's and memes can be used as tokens of appreciation to either signal gratitude, gesture of thanks or an acceptance of compliments. This can be a form of instant feedback, much appreciated and valued by children for their time and effort spent in toiling over their assignments. Considering the psychological dynamics of children's behaviour, evidence has it that children are generally reliant on personalized reward systems such as leaderboard scorings, emoji's and memes to prop up their self-esteem and give them a quick pick-me-up, as a welcome mood changer (Nahai, 2012; Ortiz-Rojas *et al.*, 2019). It also shows that such gamified elements act as a carrier for emotional contagion, along with influencing one's emotions.

Concluding discussion

Recently there has been a lot of buzz around the expression, "new normal" or "new norm"; the buzzword that has been in vogue as the outbreak of COVID-19. Drawing on this prognosis, this article champions a new conversational feed about gamification deployed in domestic, parent-led literacy programmes that hold good without a digital interface. In kind, Kapp (2014) had forecasted the profound eminence of gamification as a design sensibility, not bound by technology.
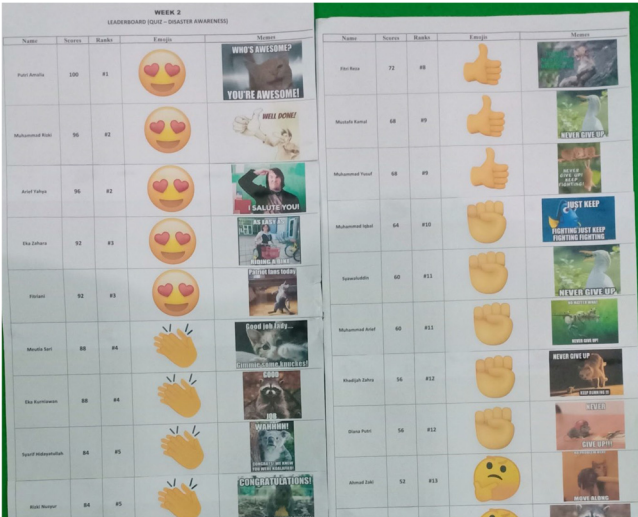

Figure 2.
A manually devised leaderboard with scores, ranks, emoji's and memes

Set in context, one of the definitive conclusions we can draw about this creatively devised pedagogy is the improved outcomes delivered particularly for children from disadvantaged and under-privileged communities, known to lack in technological staples. This research also suggests the optimal deployment of gamification applied to parent-led instruction, as a way of leveling-up children's learning experience and instilling a sense of normalcy and routine within their safe, confined households. Leveraging on the growing trend of applying game-based sensibilities into "stay-home" game plans, elements such as reward stamps, leaderboards and the like, need to be resourcefully selected; game affordances that bear intelligently in the creation of home-based activities will provide engaging and goal-oriented solutions to equalize the parent-led teaching dilemma. The proliferation of gamified learning techniques is gaining momentum especially in the revolutionary scholarship of "literacy in the new norm".

As the world grapples with the stark reality of this looming pandemic, global collective initiatives have had a head start in rolling out global conversations about panning out the futures of education and the metamorphosis of schools – flagged as alternative futures to "new norm literacy". Through UNESCO's flagship initiative, international thought leaders of various expertise have been commissioned to contrive a collective intelligence report that will emblematize education as a bulwark against inequality and for enabling lives of dignity and purpose (UNESCO, 2020b).

Notes

1. UNICEF; UN High Commission for Refugees; International Labour Organization; WHO; World Bank; World Food Programme; International Telecommunication Union; OECD; Global Partnership for Education; Education Cannot Wait; OIF; Asian Development Bank; Microsoft; GSMA; Weidong; Google; Facebook; Zoom; KPMG; Coursera; Khan Academy; Dubai Cares; Profuturo; Sesame Street; BBC World Service.

2. WHO, UNICEF, the Global Partnership to End Violence Against Children, the US Agency for International Development USAID, the US Centres for Disease Control and Prevention (CDC), Parenting for Lifelong Health and the UK Research and Innovation Global Challenges Research Fund Accelerating Achievement for Africa's Adolescents Hub (Cluver *et al.*, 2020).

References

Abramovich, S., Schunn, C. and Higashi, R.M. (2013), "Are badges useful in education? It depends upon the type of badge and expertise of learner", *Educational Technology Research and Development*, Vol. 61 No. 2, pp. 217-232.

Albrectsen, A.B. and Giannini, S. (2020), "COVID-19 school closures around the world will hit girls hardest", Plan International, available at: https://plan-international.org/blog/2020/03/covid-19-school-closures-hit-girls-hardest (accessed 31 March 2020).

Alsawaier, R.S. (2018), "The effect of gamification on motivation and engagement", *International Journal of Information and Learning Technology*, Vol. 35 No. 1.

Brewer, R., Anthony, L., Brown, Q., Irwin, G., Nias, J. and Tate, B. (2013), "Using gamification to motivate children to complete empirical studies in lab environments", *Proceedings of the 12th International Conference on Interaction Design and Children – IDC 13*, doi: 10.1145/2485760.2485816.

Buckley, P., Doyle, E. and Doyle, S. (2017), "Game on! Students' perceptions of gamified learning", *Educational Technology and Society*, Vol. 20 No. 3, pp. 1-10.

Chopik, W.J., Edelstein, R.S., van Anders, S.M., Wardecker, B.M., Shipman, E.L. and Samples-Steele, C.R. (2014), "Too close for comfort? Adult attachment and cuddling in romantic and parent-child relationships", *Personality and Individual Differences*, Vol. 69, pp. 212-216.

Cluver, L., Lachman, J.M., Sherr, L., Wessels, I., Krug, E., Rakotomalala, S., Blight, S., Hillis, S., Bachman, G., Green, O., Butchart, A., Tomlinson, M., Ward, C.L., Doubt, J. and McDonald, K. (2020), "Parenting in a time of COVID-19", *The Lancet*, Vol. 395 No. 10231, p. e64.

de Byl, P. and Hooper, J. (2013), "Key attributes of engagement in a gamified learning environment", in Carter, H. and Hedberg, J. (Eds), *Proceedings of 30th Conference of Australasian Society for Computers in Learning in Tertiary Education (ASCILITE)*, Sydney, pp. 221-229.

Ding, L., Er, E. and Orey, M. (2018), "An exploratory study of student engagement in gamified online discussions", *Computers and Education*, Vol. 120, pp. 213-226.

Doucet, A. Netolicky, D. Timmers, K. and Tuscano, F.J. (2020), "About pedagogy in an unfolding pandemic: an independent report on approaches to distance learning during COVID-19 school closures", 29 March.

Gibson, D., Ostashewski, N., Flintoff, K., Grant, S. and Knight, E. (2015), "Digital badges in education", *Education and Information Technologies*, Vol. 20 No. 2, pp. 403-410.

Greco, G. (2020), "Multilateral training using physical activity and social games improves motor skills and executive function in children with autism spectrum disorder", *European Journal of Special Education Research*, Vol. 5 No. 4.

Gostin, L.O. and Wiley, L.F. (2020), "Governmental public health powers during the COVID-19 pandemic: stay-at-home orders, business closures, and travel restrictions", *JAMA Network*, Vol. 323 No. 21.

Groening, C. and Binnewies, C. (2019), "'Achievement unlocked!' The impact of digital achievements as a gamification element on motivation and performance", *Computers in Human Behavior*, Vol. 97, pp. 151-166.

Hajal, N.J. and Paley, B. (2020), "Parental emotion and emotion regulation: a critical target of study for research and intervention to promote child emotion socialization", *Developmental Psychology*, Vol. 56 No. 3, p. 403.

Huang, B., Hew, K.F. and Lo, C.K. (2018), "Investigating the effects of gamification-enhanced flipped learning on undergraduate students' behavioral and cognitive engagement", *Interactive Learning Environments*, Vol. 27 No. 8, pp. 1106-1126.

Jurgelaitis, M., _Ceponien_e, L., _Ceponis, J. and Drungilas, V. (2018), "Implementing gamification in a university-level UML modeling course: a case study", *Computer Applications in Engineering Education*, Vol. 27 No. 2, pp. 332-343.

Kapp, K. (2014), "Gamification is about design, not technology", 2 June, available at: http://karlkapp.com/gamification-is-about-design-not-technology/

Kuo, M.-S. and Chuang, T.-Y. (2016), "How gamification motivates visits and engagement for online academic dissemination – an empirical study", *Computers in Human Behavior*, Vol. 55, pp. 16-27.

Lin, H.H., Hung, Y.P., Weng, S.H., Lee, P.Y. and Sun, W.Z. (2020), "Effects of parent-based social media and moderate exercise on the adherence and pulmonary functions among asthmatic children", *The Kaohsiung Journal of Medical Sciences*, Vol. 36 No. 1, pp. 62-70.

Lo, C.K. and Hew, K.F. (2018), "A comparison of flipped learning with gamification, traditional learning, and online independent study: the effects on students' mathematics achievement and cognitive engagement", *Interactive Learning Environments*, Vol. 28 No. 4, pp. 1-18.

Lopez, C.E. and Tucker, C.S. (2019), "The effects of player type on performance: a gamification case study", *Computers in Human Behavior*, Vol. 91, pp. 333-345.

Montoya, S. (2020), "Nurturing education at home in the midst of a health crisis: how SDG indicator 4.2.3 can help guide where more support is needed", UNESCO Institute for Statistics, 9 April.

Nah, F.F.H., Zeng, Q., Telaprolu, V.R., Ayyappa, A.P. and Eschenbrenner, B. (2014), "Gamification of education: a review of literature", *International Conference on HCI in Business*, Springer, Cham, pp. 401-409.

Nahai, N. (2012), *Webs of Influence: The Psychology of Online Persuasion*, Pearson.

Ortiz-Rojas, M., Chiluiza, K. and Valcke, M. (2019), "Gamification through leaderboards: an empirical study in engineering education", *Computer Applications in Engineering Education*, Vol. 27 No. 4, pp. 777-788.

Owusu-Fordjour, C., Koomson, C.K. and Hanson, D. (2020), "The impact of COVID-19 on learning-the perspective of the Ghanaian student", *European Journal of Education Studies*, Vol. 7 No. 3, pp. 2501-1111.

UNESCO (2020a), "COVID-19: a global crisis for teaching and learning", Programme and meeting document, 21 April, ED/ESC/TED/2020/01 REV. 2.

UNESCO (2020b), "International commission releases joint statement on education and the COVID-19 crisis", International Commission on the Futures of Education, available at: https://en.unesco.org/futuresofeducation/news/international-commission-releases-joint-statement-education-and-covid-19-crisis (accessed 14 April 2020).

UNESCO (2020c), "UNESCO rallies international organizations, civil society and private sector partners in a broad coalition to ensure #LearningNeverStops", available at: https://en.unesco.org/news/unesco-rallies-international-organizations-civil-society-and-private-sector-partners-broad (accessed 26 March 2020).

UIS (2019), *SDG 4 Data Digest: How to Produce and Use the Global and Thematic Education Indicators*, UNESCO Institute for Statistics.

UIS (2020), "UIS.Stat", The UNESCO Institute for Statistics data (UIS), available at: https://en.unesco.org/covid19/educationresponse

Wainwright, N., Goodway, J., Whitehead, M., Williams, A. and Kirk, D. (2020), "Playful pedagogy for deeper learning: exploring the implementation of the play-based foundation phase in Wales", *Early Child Development and Care*, Vol. 190 No. 1, pp. 43-53.

Wang, G., Zhang, Y., Zhao, J., Zhang, J. and Jiang, F. (2020), "Mitigate the effects of home confinement on children during the COVID-19 outbreak", *The Lancet*, Vol. 395 No. 10228, pp. 945-947.

Zainuddin, Z., Zhang, Y., Li, X. and Haruna, H. (2019), "Gamification in a non-tech information environment, is it possible?", *ASIS&T Asia Pacific Regional Conference*, Phnom Penh, Kingdom of Cambodia, doi: 10.13140/RG.2.2.36175.33440.

Zainuddin, Z., Chu, S.K.W., Shujahat, M. and Perera, C.J. (2020), "The impact of gamification on learning and instruction: a systematic review of empirical evidence", *Educational Research Review*, Vol. 30, p. 100326.

Zaki, N.A.A. (2020), "Therapeutic serious game design guidelines for stimulating cognitive abilities of children with speech and language delay", *Journal of Information and Communication Technology*, Vol. 16 No. 2, pp. 284-312.

Zuckerman, O. and Gal-Oz, A. (2014), "Deconstructing gamification: evaluating the effectiveness of continuous measurement, virtual rewards, and social comparison for promoting physical activity", *Personal and Ubiquitous Computing*, Vol. 18 No. 7, pp. 1705-1719.

Corresponding author

Zamzami Zainuddin can be contacted at: zamzami.hku@gmail.com